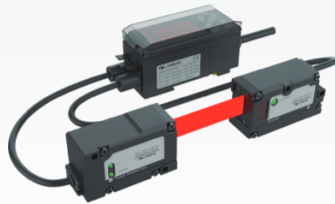


Operation manual



www.lanbaosensor.com



Precautions

- Please make sure that the power supply voltage is within the rated voltage range before powering on
- The time from powering-on to normal detection of the sensor is 100ms, please ensure that the sensor is used after 100ms of powering-on
- When using different power sources for the sensor and load, be sure to turn on the power of the sensor first
- When the sensor is not used, it is recommended to cut off the power of the load first and then turn off the power of the sensor
- Do not subject the sensor to severe external forces (such as hammer hits, etc.) during installation, so as not to damage the sensor performance
- Avoid using thinner, alcohol or other organic solvents when cleaning

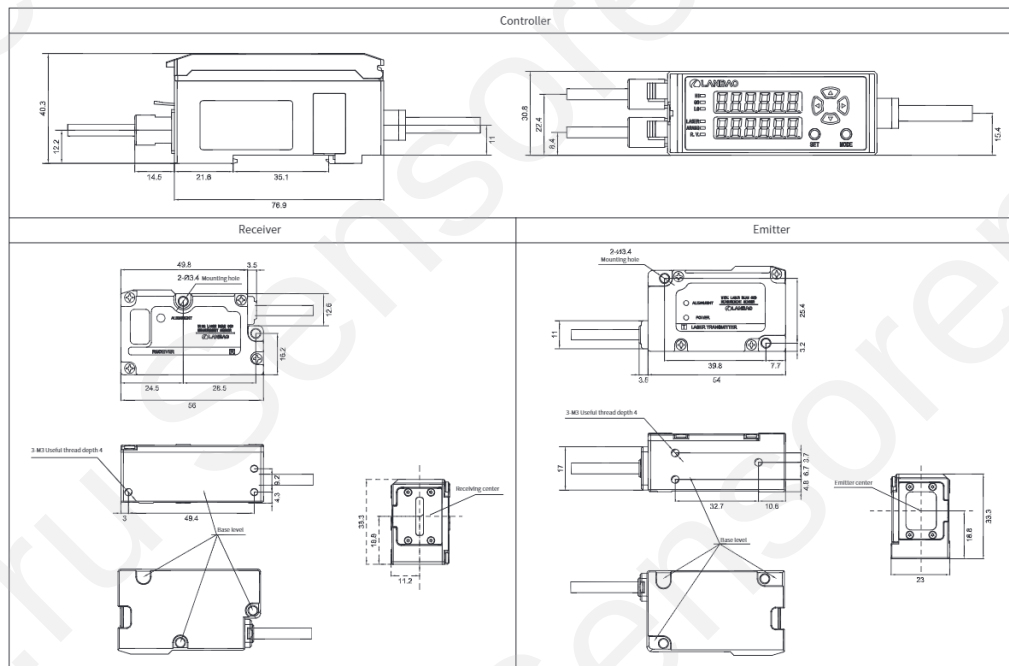
Safety Warning

- Do not use in an environment with flammable, explosive or corrosive gases
- Do not use in oil or chemical environments
- Do not use in a high humidity environment
- Do not use in direct sunlight
- Do not use in other environmental conditions that exceed the rated value
- Do not disassemble, service or modify this product without authorization

Scrap Treatment

- When the product is scrapped, please dispose of it as industrial waste

Dimensions



Technical specifications

Receiver and Emitter

Model	PDM-TC50TGR
Measuring range	Width mode: 10mm; Edge mode: 10mm
Installation distance	0...500mm
Minimum sensing object	∅1mm (Setting distance: 500 mm) ^①
Light source	Red laser (Laser level: Class 1)
Light spot size	14*12mm
Supply voltage	12...24VDC
Voltage drop	<2.5V
Linear accuracy	±0.28%F.S.
Repeat accuracy	10μm (Setting distance: 100 mm) ^② ; 15μm (Setting distance: 500 mm) ^②
Dimension	Cast light: 55°32'23mm; Receive light: 55°32'23mm
Temperature drift	±0.08 %F.S./°C (±8μm/°C)
Indicator (Emitter)	Optical axis alignment indication: green LED; power indicator: green LED
Indicator (Receiver)	Optical axis alignment indication: green LED; position display: dual bar LED (yellow, green)
Anti ambient light	Incandescent: <3,000lux
Protection degree	IP50
Ambient temperature	-10...45°C (No frost)
Environment humidity	35...85%RH (No frost)
Material	Housing: Aluminium
Connection	PVC cable

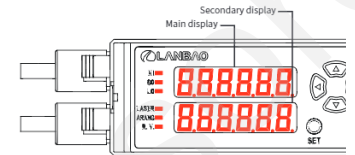
Controller

Supply voltage	12...24VDC
Consumption current	<900mA (Including receiver/emitter)
Display resolution	1 μm
Display range	-99.999...99.999
Display mode	Two-digit 8 segment display; upper and lower levels: red, 6 digit
Response time	2ms
Output 1	NPN NC
Output 2	RS485 Output
Ambient temperature	-10...45°C (No freezing)
Environment humidity	35...85%RH (No frost)
Material	Housing: Plastic
Installation	Guide rail installation

Remarks: ①When the installation distance is 100mm, the light is blocked at the position 50mm away from the receiver. The margin of error to the ideal straight line.
②When the light is blocked by half at the middle position of the installation distance. Average times is set to 16 and sampling for 30 seconds.

Panel introduction

Controller



Button

SET	Setting button
MODE	Mode button

Display

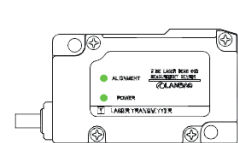
Main display	①Result display	②Me
Secondary display	③Result display	④Sut

*Note: The digital tube above when facing the controller.

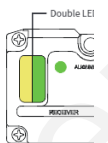
Indicator

Name	Color	Normal c
LASER	Green	Laser
HI	Green	Switch
GO	Green	Switch
LO	Green	Switch
A-RANG	Green	Emitter and receiv

Emitter



Receiver



Emitter: Indicator

Name	Color	Normal on
ALIGNMENT	Green	Emitter and receiver
POWER	Green	Power i

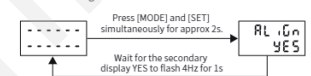
Receiver: Indicator

Name	Color	Normal on
ALIGNMENT	Green	Emitter and receiver
Double LED	Yellow/Green	Measurement status in diff

Operation instruction

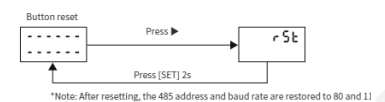
1. Install emitter and receiver in alignment, and connect to controller, the Emitter: POWER indicator on, ALIGNMENT indicator on
Receiver: ALIGNMENT indicator on, double (yellow / green) indicator on
Controller: POWER indicator on, A-RANG indicator on, if there is no sensi shows:

2. Waveform login

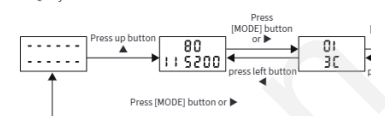


3. Basic operation

3.1 Reset



3.1 Query



Query content

80: RS-485 stack address	01: Emitter class	2
11: 5200: Baud rate	3C: Binarization (60)	nPn

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	00 32	MSB:00 LSB:xx	LSB	MSB	

Note: Modification range: 00: EDG (Edge Mode); 01: DIA (Diameter Mode); 02: GAP (Gap Mode).

For example: 1.Set the sensor measurement mode to Edge Mode. Then send the command via the RS485 bus: 80 06 00 32 00 00 36 14
2.Set the sensor measurement mode to Diameter Mode. Then send the command via the RS485 bus: 80 06 00 32 00 01 F7 D4
Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.3 Main stack modify measurement direction

Master request message format (Measurement direction setting)

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	00 33	MSB:00 LSB:xx	LSB	MSB	

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	00 33	MSB:00 LSB:xx	LSB	MSB	

Note: (1) Modification range: 00: Top (Top Mode); 01: Btm (Bottom Mode).

(2) This item is only valid in Edge Mode.

For example: 1.Set the sensor measurement direction to Top Mode. Then send the command via the RS485 bus: 80 06 00 33 00 00 67 D4
2.Set the sensor measurement direction to Bottom Mode. Then send the command via the RS485 bus: 80 06 00 33 00 01 A6 14
Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.4 Main stack modify sensitivity

Master request message format (Sensitivity setting)

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	00 34	MSB:00 LSB:xx	LSB	MSB	

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	00 34	MSB:00 LSB:xx	LSB	MSB	

Note: Modification range: 00: Medium Sensitivity; 01: High Sensitivity; 02: Low Sensitivity.

For example: 1.Set the sensor sensitivity to Low Sensitivity. Then send the command via the RS485 bus: 80 06 00 34 00 02 57 D4
2.Set the sensor sensitivity to Medium Sensitivity. Then send the command via the RS485 bus: 80 06 00 34 00 01 17 D5
Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.5 Main stack modify filtering level

Master request message format (Filtering level setting)

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	00 40	MSB:00 LSB:xx	LSB	MSB	

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	00 40	MSB:00 LSB:xx	LSB	MSB	

Note: Modification range: 00: High Speed; 01: Medium Speed; 02: Low Speed.

For example: 1.Set the sensor filtering level to Medium Speed. Then send the command via the RS485 bus: 80 06 00 40 00 01 57 CF
2.Set the sensor filtering level to Low Speed. Then send the command via the RS485 bus: 80 06 00 40 00 02 17 CE
Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.6 Main stack modify action point

Master request message format (Action point setting)

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	9C 75	MSB:00 LSB:xx	LSB: A8	MSB: 51	

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	9C 75	MSB:00 LSB:xx	LSB: A8	MSB: 51	

Note: When setting the action point, the sensor must have a valid measurement value; otherwise, the setting is invalid.

For example: Set the action point to the current measurement value of the sensor. Then send the command via the RS485 bus: 80 06 9C 75 00 00 A8 51
Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.7 Main stack modify switch logic

Master request message format (Switch logic setting)

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	9C 74	MSB:00 LSB:xx	LSB	MSB	

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	9C 74	MSB:00 LSB:xx	LSB	MSB	

Note: Modification range: 00: NPN; 01: PNP; 02: PP (Push-Pull).

For example: 1.Set the sensor switch logic to NPN. Then send the command via the RS485 bus: 80 06 9C 74 00 00 F9 91

2.Set the sensor switch logic to PNP. Then send the command via the RS485 bus: 80 06 9C 74 00 01 38 51

3.Set the sensor switch logic to PP (Push-Pull). Then send the command via the RS485 bus: 80 06 9C 74 00 02 78 50

Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.8 Main stack modify switch mode

Master request message format (Switch mode setting)

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	9C 73	MSB:00 LSB:xx	LSB	MSB	

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	9C 73	MSB:00 LSB:xx	LSB	MSB	

Note: Modification range: 00: NO (Normally Open); 01: NC (Normally Closed).

For example: 1.Set the sensor switch mode to NO (Normally Open). Then send the command via the RS485 bus: 80 06 9C 73 00 00 48 50
2.Set the sensor switch mode to NC (Normally Closed). Then send the command via the RS485 bus: 80 06 9C 73 00 01 89 90
Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.9 Main stack modify slave address

Master request message format (Slave address setting)

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	9C 7E	MSB:00 LSB:xx	LSB	MSB	
80	06	9C 7E	MSB:00 LSB:xx	LSB	MSB	

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
LSB:xx	06	9C 73	MSB:00 LSB:xx	LSB	MSB	

Note: (1) 00 is the broadcast address, which can be used when the current communication address is unknown.

(2) The address modification range is 0x80 to 0xF4 and the setting takes effect immediately after being set.

For example: 1.The current address is known to be 0x80 and it is set to 0x81. Then send the command via the RS485 bus: 80 06 9C 7E 00 81 19 F3
2.The current address is known to be 0x81 and it is set to 0x82. Then send the command via the RS485 bus: 81 06 9C 7E 00 82 58 23
Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.10 Main stack modify baud rate

Master request message format (Baud rate setting)

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	9C 7F	MSB:00 LSB:xx	LSB	MSB	

Baud rate code					
115200	57600	38400	19200	9600	
01	02	03	04	05	

Note: (1) The current baud rate must be known when setting and the setting takes effect immediately after being successful.

(2) The baud rate modification range is 01 to 05 (5 levels).

For example: 1.The current baud rate is 115200 and it is set to 57600. Then send the command via the RS485 bus: 80 06 9C 7F 00 02 09 92
2.The current baud rate is 115200 and it is set to 9600. Then send the command via the RS485 bus: 80 06 9C 7F 00 05 48 50
Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.11 Main stack waveform registration

Master request message format (Waveform registration)

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	00 37	MSB:00 LSB:01	LSB: E7	MSB: D5	

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	00 37	MSB:00 LSB:01	LSB: E7	MSB: D5	

Note: If there is any change in the sensor head installation position or if parameters have been set, a "Waveform registration" must be performed. Before "Waveform registration", it is necessary to adjust the sensor head alignment position properly.

For example: The sensor performs a waveform registration for the current installation position.

Then send the command via the RS485 bus: 80 06 00 37 00 01 E7 D5

Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.12 Main stack modify emission level

Master request message format (Emission level setting)

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	00 30	MSB:00 LSB:xx	LSB	MSB	

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value	Redundancy check CRC16-2		
80	06	00 30	MSB:00 LSB:xx	LSB	MSB	

Note: (1) The emission level setting command is used to adjust the current intensity.

(2) Modification range: 0x01 to 0x14, which corresponds to level 1 to level 14.

For example: 1.The sensor wants to set the emission level to Level 20. Then send the RS485 bus: 80 06 00 30 00 14 97 DB

2.The sensor wants to set the emission level to Level 7. Then send the RS485 bus: 80 06 00 30 00 07 D6 16

Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.13 Main stack modify binarization level

Master request message format (Binarization level setting)

Slave address	Function code	Data storage address	Modified value			
80	06	00 35	MSB:00 LSB:xx	MSB:00	LSB:xx	

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value			
80	06	00 35	MSB:00 LSB:xx	MSB:00	LSB:xx	

Note: The modification range is 0A to 5A (10 to 90).

For example: 1.Set the sensor's binarization level to 10. Then send the command via the RS485 bus: 80 06 00 35 00 0A 07 D2

2.Set the sensor's binarization level to 90. Then send the command via the RS485 bus: 80 06 00 35 00 5A 07 EE

Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.14 Main stack modify calibration mode

Master request message format (Calibration mode)

Slave address	Function code	Data storage address	Modified value			
80	06	00 21	MSB:00 LSB:xx	MSB:00	LSB:xx	

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value			
80	06	00 21	MSB:00 LSB:xx	MSB:00	LSB:xx	

Note: (1) Modification range: 00 (One-point Calibration); 01 (Two-point Calibration).

(2) One-point Calibration:

Current measurement value = Actual measurement value + Calibration value

(3) Two-point Calibration:

Current measurement value = Actual measurement value - Calibration value

For example: 1.Set the sensor calibration mode to One-point Calibration via the RS485 bus: 80 06 00 21 00 00 C7 D1

2.Set the sensor calibration mode to Two-point Calibration via the RS485 bus: 80 06 00 21 00 01 06 11

Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.15 Main stack modify calibration value

Master request message format (Calibration value)

Slave address	Function code	Data storage address	Modified value			
80	06	00 22	MSB	LSB		

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value			
80	06	00 22	MSB	LSB		

Note:The modification range is from 0x00 to 0x2710 (0 to 10000 μ m).

For example: The sensor sets the current parameter to the calibration value via the RS485 bus: 80 06 00 22 27 10 2D ED

Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.16 Main stack factory reset

Master request message format (Factory reset setting)

Slave address	Function code	Data storage address	Modified value			
80	06	9C 87	MSB:00 LSB:01	MSB:00	LSB:01	

After successful setup, slave response message format:

Slave address	Function code	Data storage address	Modified value			
80	06	9C 87	MSB:00 LSB:01	MSB:00	LSB:01	

Note: After the setting, the switch logic and mode will be restored to NPN and Mode.

For example: The sensor will restore the switch logic. Then send the command via the RS485 bus: 80 06 9C 87 00 01 C8 62

Response: If the setting is successful, return the original setting command; if the setting fails, return an error code.

4.17 Main stack error code

Slave address	Function code	Error code	Redundancy check CRC16-2			
80	83/86	xx	LSB	MSB		

Note: There are 5 types of error codes as follows:

1.Error Code 01: The function code of the sent instruction is incorrect.

2.Error Code 02: The register address of the sent instruction is out of range.

3.Error Code 03: The sent data value is out of range.

4.Error Code 04: Slave device failure, an irrecoverable error occurs during the requested action.

5.Error Code 07: No response, the slave device cannot complete the function.